

Determining Forage Production and Stocking Rates: A Clipping Procedure for Rangelands

by Larry Brence and Roger Sheley*

Stocking rates are determined by balancing the amount of forage available with the amount needed by livestock. These rates are the number of animals and the duration they can graze a pasture or management unit without overgrazing or underutilizing the forage. Stocking rates are measured in Animal Unit Months (AUMs) which is the amount of forage necessary for sustenance of a 1,000-pound cow and its calf (under four months old) or the equivalent for a period of one month. For example, a stocking rate of 100 AUMs indicates 100 cow-calf pairs can use a pasture for one month, or 50 cow-calf pairs can graze the same area for two months. Animals differ in their forage requirements. Some suggested animal unit conversion factors are presented in Table 1. This MontGuide provides a simple method for converting actual mea-

Table 1. Common animal unit conversion factors.

| | AU |
|--------------------------------|------|
| Cow (1,000 lb.) with calf | 1.00 |
| Mature bull | 1.25 |
| Yearling (under 17 mo.) | .70 |
| Ewe (and lamb less than 2 mo.) | .20 |
| Horse | 1.25 |
| Elk | .65 |
| Mule deer | .25 |

surements of forage production into stocking rates using AUMs.

Materials Needed:

- Hoop
- Grass Clippers
- Hand-held spring scale that weighs in grams. A 500-gram scale works best.
- Small to medium-size grocery bags

A hoop can be made simply from 1/4-inch coated cable available from most farm and ranch supply outlets. Purchase 93" of cable and fasten the ends together with a 1/4-inch cable ferrule. The cable can be clamped in the ferrule with a chisel or heavy screwdriver

and hammer. A 500-gram scale can be purchased from forestry, animal health, or surveying companies for about \$38.

Selecting Sites to Clip

Select a site to clip where soils, slope, and grasses are representative of the pasture that is to be surveyed. In areas where topography and soils are variable, it may be wise to survey a number of sites and average the results so that more reliable data can be obtained.

When Should Clipping be Done?

For the most accurate results, vegetation should be at maturity, and no grazing should have occurred. The grass must be mature to provide total forage production. Sample in late-grazed pastures or find areas in pastures that have not been grazed. It may also be necessary to fence out a small section of a pasture. For most Montana

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rangelands, clipping after July 1 will yield the most accurate results. Table 2 (see back page) gives the percent dry matter of forages at various stages of maturity.

Growing conditions in a given year will affect forage production. If stocking rate estimates are done during a year of weather extremes, it may be necessary to re-estimate in subsequent years under more normal conditions to get more accurate results.

Steps for Measuring Forage Production

Step 1: Pre-weigh empty bags.

Weigh an empty paper bag in grams and write the weight on the bag. This weight will be important for calculations later.

Step 2: Toss hoop and clip forage.

Randomly toss the hoop and let it land flat on the ground. Clip plants within the hoop to ground level making sure to sort out all litter, roots, or soil. Also discard all weeds or other plants which are not forage species.

Note: Clip at least four hoops to insure reliable forage production estimates. The more hoops that are clipped, the more reliable the forage production estimate will be.

Step 3: Weigh clippings.

Place forage clippings in bags and weigh with gram scale. Weights should be marked on each bag.

Step 4: Complete worksheet calculations.

Complete the following worksheet using the weights recorded on the paper sacks and a calculator.

Table 2. Percentage of dry matter of forage/grasses¹

| | Before heading— Initial growth to boot stage | Headed out— Boot stage to flowering | Seed ripe— Leaf tips drying | Leaves dry— Stems partly dry | Apparent dormancy |
|---|--|---|-----------------------------------|------------------------------------|----------------------|
| Cool Season | | | | | |
| wheatgrasses, perennial bromes, bluegrasses, prairie junegrass, fescues | 35% | 45% | 60% | 85% | 95% |
| Warm season | | | | | |
| <i>Tall grasses:</i> bluestems, Indiangrass, switchgrass | 30% | 45% | 60% | 85% | 95% |
| <i>Mid grasses:</i> side-oats grama | 40% | 55% | 65% | 90% | 95% |
| <i>Short grasses:</i> blue grama, buffalograss, short 3-awns | 45% | 60% | 80% | 90% 95% | |

¹Source: *National Range Handbook*

Stocking Rate Worksheet

Pasture/Unit: _____

Date: _____

Step 1: Calculate pounds of forage produced per acre.

Site 1

| 1 | 2 | 3 | 4 | Total | |
|---|-------|-------|-------|-------|---|
| A. _____ | _____ | _____ | _____ | _____ | A. Total weight of all sample in grams. |
| B. _____ | _____ | _____ | _____ | _____ | B.Total weight of empty bags in grams. |
| C. Total weight of all samples (A - B = C) | | | | _____ | |
| D. Average weight per sample (Divide C by 4) | | | | _____ | |
| E. Pounds of forage per acre (Multiply D by 20) | | | | _____ | |

Site 2

| 1 | 2 | 3 | 4 | Total | |
|---|-------|-------|-------|-------|---|
| A. _____ | _____ | _____ | _____ | _____ | A. Total weight of all sample in grams. |
| B. _____ | _____ | _____ | _____ | _____ | B.Total weight of empty bags in grams. |
| C. Total weight of all samples (A - B = C) | | | | _____ | |
| D. Average weight per sample (Divide C by 4) | | | | _____ | |
| E. Pounds of forage per acre (Multiply D by 20) | | | | _____ | |

Site 3

| 1 | 2 | 3 | 4 | Total | |
|---|-------|-------|-------|-------|---|
| A. _____ | _____ | _____ | _____ | _____ | A. Total weight of all sample in grams. |
| B. _____ | _____ | _____ | _____ | _____ | B.Total weight of empty bags in grams. |
| C. Total weight of all samples (A - B = C) | | | | _____ | |
| D. Average weight per sample (Divide C by 4) | | | | _____ | |
| E. Pounds of forage per acre (Multiply D by 20) | | | | _____ | |

Site 4

| 1 | 2 | 3 | 4 | Total | |
|---|-------|-------|-------|-------|---|
| A. _____ | _____ | _____ | _____ | _____ | A. Total weight of all sample in grams. |
| B. _____ | _____ | _____ | _____ | _____ | B.Total weight of empty bags in grams. |
| C. Total weight of all samples (A - B = C) | | | | _____ | |
| D. Average weight per sample (Divide C by 4) | | | | _____ | |
| E. Pounds of forage per acre (Multiply D by 20) | | | | _____ | |

continue on back

Step 2. Calculate the average dry weight of usable forage.

| Site 1 | Site 2 | Site 3 | Site 4 | Total | |
|---|--------|--------|--------|---------|---|
| _____ | _____ | _____ | _____ | _____ | Pounds of forage (E) per acre from each site |
| 1. Divide total by number of sites | | | | | |
| 2. Select percent dry matter of forage from Table 2 | | | | x _____ | |
| 3. Multiply line 1 times line 2 | | | | = _____ | Pounds of dry forage per acre |
| 4. Multiply by your utilization percentage | | | | x _____ | (e.g. 50%, take half, leave half) |
| 5. Amount of usable dry forage per acre | | | | = _____ | |
| 6. Number of acres in pasture | | | | x _____ | |
| 7. Multiply line 5 by line 6 | | | | = _____ | Total usable forage in pasture |
| 8. Total forage required by cow/calf for 1 month | | | | / _____ | |
| 9. Divide line 7 by line 8 | | | | = _____ | Total number of animal units that can be fed for a month |
| 10. Number of months pasture is grazed each year | | | | / _____ | |
| 11. Divide line 9 by line 10 | | | | = _____ | Stocking rate or the number of animal units the pasture can support |



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